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10/826,537	04/15/2004	Kwok Wai Cheung	IPVBP004	2147

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EXAMINER	
BLAIR, KILE O	

ART UNIT	PAPER NUMBER
2614	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/826,537	CHEUNG ET AL.	
	Examiner	Art Unit	
	Kile O. Blair	2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 March 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-16,18-22,24,25 and 27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-16,18-22,24,25 and 27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This Office action is in response to the communication filed 3/18/09. Claims 1-3, 5-16, 18-22, 24, 25, and 27 are pending.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/18/09 has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-3, 5-16, 18-22, 24, 25, and 27 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claims 1, 16, and 27 recited increasing the frequency of an ultrasonic signal and the beam width increases. This feature is not enabled, since

the prior art teaches that as the frequency increases, the beam width decreases (see for example: sec 2.1 of Aoki et al. (K. Aoki et al., "Parametric Loudspeaker-Applied Examples," Electronics and Communications Japan, Part 3, Vol. 77, No. 1, 1994, pp. 64-74., see IDS filed 1/21/05. In the remarks filed 3/18/09, applicant provides an explanation for the unexpected results, however the reasons for the results recited by applicant (i.e. an increase in frequency results in an increase in beam width) are not apparent from applicant's explanation. For example, it is not apparent how Equation 20 in "Equations of nonlinear acoustics," by V.P. Kuznetsov (see IDS filed 1/21/05), cited by applicant in the remarks, relates to the frequency and beam width of an ultrasonic signal.

Claims 2, 3, 5-15, 18-22, 24, and 25 are rejected for incorporating the errors of the claims on which they depend.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3, 5, 7, 9, 13, 16, 18, 20, 22, 24, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pompei (US Pub. No. 2001/0007591 A1, see PTO-

892 mailed 5/2/08) in view of Takahashi et al. (US Pat. No. 6,643,377, hereinafter as Takahashi, see PTO-892 mailed 10/29/07).

Regarding claim 1, Pompei teaches a directional audio delivery apparatus for a system, comprising: audio conversion circuitry that produces ultrasonic signals based on the decoded audio signals provided by a device (a modulator 112 receives a composite audio signal from the summer 110 and an ultrasonic carrier signal from the carrier generator 114, and modulates the ultrasonic carrier signal with the composite audio signal, Pompei, [0022]); and a directional speaker that outputs an ultrasonic output for a user based on the ultrasonic signals (acoustic transducer array 122, Pompei, [0022]), wherein said apparatus further comprises a beam-attribute control unit operatively connected to said directional speaker (delay circuit 120 for applying a phase shift for steering/focusing/shaping the ultrasonic beam, Pompei, [0035]), said beam-attribute control unit being configured to electronically control an attribute of the output of said directional speaker (the delay circuit causes the phased array to vary audio beam characteristics, Pompei, [0039]), wherein the ultrasonic output generates audio output (a suitably controlled phased array may transmit multiple ultrasonic beams simultaneously so that multiple audible beams are generated in the desired directions, Pompei, [0039]), wherein the attribute controls the width of the beam of the audio output by controlling the ultrasonic frequency of the ultrasonic signals (ultrasonic beams with different frequencies, [0039]) so that if the ultrasonic frequency is increased, the attenuation and the width of the beam are also increased (if the natural result of

increasing the ultrasonic frequency is an increase in attenuation and beam width then the relationship is inherent in the apparatus of Pompei).

Although Pompei does not explicitly teach the feature wherein the ultrasonic frequency is controlled including by selecting a carrier frequency from a predetermined set of carrier frequencies, Pompei teaches that that beams with different frequencies propagate along different paths (Pompei, [0039]). It would have been obvious to one of ordinary skill in the art to provide a predetermined set of carrier frequencies for driving the various transducers in order to match ultrasonic carrier frequencies with the center frequency of each transducer since it is disclosed that the center frequencies of individual transducers span a desired frequency range (Pompei, [0060]) and that the center frequency of the transducer and the ultrasonic carrier frequency are preferably the same value (Pompei, [0037]).

Although Pompei does not teach the limitation a device that receives incoming encoded signals and provides decoded audio signals for use by the system, Takahashi teaches a set top box (Takahashi, Col. 3, lines 53-57) which inherently receives encoded signals and provides decoded audio signals to the system which outputs ultrasonic waves (Takahashi, Col. 3, lines 44-53). It would have been obvious to use the apparatus of Pompei with any device that receives incoming encoded signals and provides decoded audio signals for use by the system; specifically a set top box as disclosed by Takahashi, with the motivation of outputting audio with high directionality as disclosed by Takahashi, where the set top box receives an encoded signal and

decodes it into an audio signal, at which point the circuitry of Pompei converts it into an ultrasonic signal.

Further, although Pompei does not explicitly disclose the feature wherein the beam-attribute control unit receives wireless inputs from the user via an electronic device to control the attribute, Takahashi teaches a remote controller (commander, Takahashi, col. 4, lines 43-51) for controlling the beam direction by rotating the speakers and it would have been obvious to one of ordinary skill in the art to use the commander of Takahashi with the apparatus of Pompei with the motivation of allowing a user to control the device wirelessly.

Regarding claim 2, Pompei in view of Takahashi teaches a directional audio delivery apparatus as recited in claim 1, wherein said system is one of an audio system, a stereo system, a television system (set top box, Takahashi, Col. 3, lines 53-57), a radio receiver, Digital Versatile Disc (DVD) player, a compact disc (CD) player, and a Video Cassette Recorder (VCR) player.

Regarding claim 3, Pompei in view of Takahashi teaches a directional audio delivery apparatus as recited in claim 1. Although Pompei does not explicitly disclose that the speaker is repositionable with respect to the system in his own invention, Pompei does disclose that the prior art teaches a directional speaker that is repositionable with respect to said system (ultrasonic signal is typically directed along the selected projection path by a mechanical steering device, Pompei, [0006]). It would have been obvious to one of ordinary skill in the art to implement, into the apparatus of

Pompei in view of Takahashi, the feature of mechanical steering, or repositioning, as disclosed as prior art by Pompei since doing so would have been obvious to try.

Regarding claim 5, Pompei in view of Takahashi teaches a directional audio delivery apparatus as recited in claim 1, wherein said beam-attribute control unit is also configured to electronically control a beam direction of the audio output of said directional speaker so that the beam direction of the audio output can be changed (steering the modulated ultrasonic beam in a direction electronically, Pompei, [0040]).

Regarding claim 7, Pompei in view of Takahashi teaches a directional audio delivery apparatus as recited in claim 1, wherein said directional speaker has a plurality of separately controllable regions, and wherein said beam-attribute control unit activates one or more of the controllable regions to control the ultrasonic output from said directional speaker (the acoustic transducers 0-11 [Pompei, 0025] each output an ultrasonic beam simultaneously so that multiple audible beams are generated in desired directions, [Pompei, 0039]).

Regarding claim 9, Pompei in view of Takahashi teaches a directional audio delivery apparatus as recited in claim 1, further comprising one additional directional speaker to create stereo effect (left and right speakers, Takahashi, Col. 3, lines 44-53). Although Pompei does not explicitly teach the feature of using two speakers to create a stereo effect, it would have been obvious to one of ordinary skill in the art to use this configuration as disclosed by Takahashi with the motivation of creating a stereo effect which is well known in the art.

Regarding claim 13, Pompei in view of Takahashi teaches a directional audio delivery apparatus as recited in claim 1, wherein said directional audio delivery apparatus further comprises an environmental adjustment unit that is configured to modify the audio signals or the ultrasonic signals in accordance with a piece of information from the environment in the vicinity of a portable device used by the user of said apparatus (the temperature/humidity control device 130 may include a thermostatically controlled cooler, or a dehumidifier that maintains desired atmospheric conditions along the path traversed by the ultrasonic beam based on the preexisting conditions, Pompei, [0044]).

Claim 16 is substantially similar to claim 1 and is rejected for the same reasons.

Regarding claim 18, Pompei in view of Takahashi teaches a method as recited in claim 16.

Although Pompei does not explicitly disclose altering the orientation of the directional speaker, Pompei does disclose that the prior art teaches a directional speaker that is repositionable with respect to said system (ultrasonic signal is typically directed along the selected projection path by a mechanical steering device, Pompei, [0006]) and Takahashi discloses a rotating speaker (col. 5, lines 11-15). It would have been obvious to one of ordinary skill in the art to implement, into the method of Pompei in view of Takahashi, the feature of mechanical steering, or repositioning, as disclosed as prior art by Pompei with the motivating of outputting sound in various directions.

Regarding claim 20, Pompei in view of Takahashi teaches a method as recited in claim 16, wherein the beam attribute input being received is automatically provided, not

based on an input entered by the user (the temperature/humidity control device 130 may include a thermostatically controlled cooler, or a dehumidifier that maintains desired atmospheric conditions along the path traversed by the ultrasonic beam based on the preexisting atmospheric conditions, Pompei, [0044]).

Regarding claim 22, Pompei in view of Takahashi teaches a method as recited in claim 16, wherein the directional speaker has a plurality of segments to emit the directionally constrained audio; and wherein the segments can be individually controlled for emitting the directionally constrained audio (the acoustic transducers 0-11 [Pompei, 0025] each output an ultrasonic beam simultaneously so that multiple audible beams are generated in desired directions, [Pompei, 0039]).

Regarding claim 24, Pompei in view of Takahashi teaches a method as recited in claim 22, wherein the attribute controls at least one of the many segments to affect the width or the direction of the directionally constrained audio (the temperature/ humidity control maintains desired atmospheric conditions along the path traversed by the ultrasonic beam, from the transducer to the listener, Pompei [0044]).

Claim 27 is substantially similar to claim 1 except for the additional features of a portable electronic remote control and a mechanical mechanism that allows a user to set a beam attribute input, therefore claim 27 is rejected for the same reasons as claim 1 and additionally because although Pompei does not explicitly disclose the feature of a portable electronic remote control and a mechanical mechanism that allows a user to set a beam attribute input, Takahashi teaches a portable remote controller (commander, Takahashi, col. 4, lines 43-51) with a mechanical mechanism that allows a user to set a

beam attribute input (push-button switch 703, Takahashi, col. 4, lines 47-51) and it would have been obvious to one of ordinary skill in the art to use the commander of Takahashi with the apparatus of Pompei with the motivation of allowing a user to control the device wirelessly.

Claims 6, 19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pompei in view of Takahashi in further view of Kuriyama et al. (JP Pub. No. 1-109898, hereinafter as Kuriyama, see PTO-892 mailed 11/18/08).

Regarding claim 6, Pompei in view of Takahashi teaches a directional audio delivery apparatus as recited in claim 5.

Although Pompei in view of Takahashi does not explicitly disclose the feature wherein the beam direction depends on the position of an electronic device, and wherein as the position of the electronic device changes, the beam direction can automatically change, Takahashi does teach a remote controller (commander, Takahashi , col. 4, lines 43-51) for controlling the beam direction by rotating the speakers, although not the specific feature wherein the beam direction changes as the position of the electric device (i.e. remote control) changes. Kuriyama teaches a system of directing a set of speakers to a remote control based on signals transmitted to a light receiving element indicating a position of the remote control (see English abstract and constitution) and it would have been obvious to use this system of automatic beam direction control with the apparatus of Pompei in view of Takahashi with the motivation

of improving a similar device with the feature of automatic beam direction control in the same way that Kuriyama has improved a conventional speaker and remote control unit.

Regarding claim 19, Pompei in view of Takahashi teaches a method as recited in claim 16.

Although Pompei in view of Takahashi does not explicitly teach the feature wherein the beam attribute input depends on a distance or a position of an object, Kuriyama teaches directing a set of speakers to a remote control based on signals transmitted to a light receiving element indicating a position of the remote control (see English abstract and constitution, Kuriyama) and it would have been obvious to one of ordinary skill in the art to implement the feature of directing a set of speakers to a remote control with the apparatus of Pompei in view of Takahashi with the motivation of customizing the sound output to the position of a user.

Regarding claim 21, Pompei in view of Takahashi teaches a method as recited in claim 16.

Although Pompei in view of Takahashi does not explicitly teach the feature wherein in view of a beam-attribute input, the direction of the directionally constrained audio is changed, Kuriyama teaches directing a set of speakers to a remote control based on signals transmitted to a light receiving element indicating a position of the remote control (see English abstract and constitution, Kuriyama) and it would have been obvious to one of ordinary skill in the art to implement the feature of directing a set of speakers to a remote control with the apparatus of Pompei in view of Takahashi with the motivation of customizing the sound output to the position of a user.

Claims 8 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pompei in view of Takahashi in further view of Norris et al. (US Pub. No. 2004/0052387 A1, hereinafter as Norris, see PTO-892 mailed 5/2/08).

Regarding claim 8, Pompei in view of Takahashi teaches a directional audio delivery apparatus as recited in claim 1. Although Pompei in view of Takahashi does not explicitly teach the feature wherein said directional speaker has a curved surface, which can be a curved emitting surface or a curved reflecting surface, so that the audio output produced is intentionally configured to be non-collinear, Pompei does teach that multiple audible beams may be generated in desired directions (Pompei, [0039]). Norris discloses a speaker with a convex emitter plate comprising an array of cavities that allows sound to be generated over a broad area (Norris, [0154]). It would have been obvious to one of ordinary skill in the to use the devices of Pompei and Norris to cause the sound output to be non-collinearly generated in a number of directions since doing so would have yielded a predictable result.

Regarding claim 25, Pompei in view of Takahashi teaches a directional audio delivery apparatus as recited in claim 1. Although Pompei in view of Takahashi in further view of Kuriyama does not explicitly teach the feature wherein the beam-attribute control unit is configured to change a beam width of the audio output of said directional speaker so that the beam width is diverging around the vicinity of the user, Norris discloses a convex configuration of transducers (Norris, Fig. 15) and it would have been obvious to one of ordinary skill in the art to configure the transducer array of Pompei in

such a manner as that of Norris with the motivation of having the ultrasonic beams diverge around the user after being affected by the temperature/humidity control device (the temperature/humidity control device maintains desired atmospheric conditions along the path traversed by the ultrasonic beam, Pompei, [0044]).

Claims 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pompei in view of Takahashi in further view of Wiser et al. (US Pub. No. 2003/0009248 A1, hereinafter as Wiser, see PTO-892 mailed 2/22/08).

Regarding claim 10, Pompei in view of Takahashi teaches a directional audio delivery apparatus as recited in claim 1.

Although Pompei in view of Takahashi in further view of Kuriyama does not explicitly teach the feature wherein said apparatus further comprises a personalization unit operatively connected to said audio conversion circuitry, said personalization unit modifies the audio signals or the ultrasonic signals in accordance with an audio characteristic associated with a user of said apparatus, it would have been obvious to one of ordinary skill in the art to utilize the audio processing profiles of Wiser ([0088]) into the set top box of Pompei in view of Takahashi with the motivation of providing a more suitable and personalized audio signal to the individual.

Regarding claim 12, Pompei in view of Takahashi in further view of Wiser teaches a directional audio delivery apparatus as recited in claim 10, wherein the audio characteristic pertains to a hearing characteristic and/or a hearing preference

associated with the user (user can edit audio profile using equalizer button, Wiser, [0088]).

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pompei in view of Takahashi in further view of Wiser and in further view of Brain (Brain; Marshall, How USB Ports Work, October 11, 2002, www.howstuffworks.com/usb, see IDS filed 1/17/08).

Regarding claim 11, Pompei in view of Takahashi in further view of Wiser teaches a directional audio delivery apparatus as recited in claim 10.

Although Pompei in view of Takahashi in further view of Wiser does not explicitly teach the feature wherein the audio characteristic is provided to said directional audio delivery apparatus in a removable, portable data storage device that can be electrically connected to said apparatus, it would have been obvious to one of ordinary skill in the art to store the audio characteristic in a portable USB drive as taught by Brain (storage device, pg. 4, ¶ 5) with the motivation of making the characteristics portable from set top box to set top box.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pompei in view of Takahashi in further view of Kuriyama in further view of Tokumo et al. (US Pat. No. 4,476,571, hereinafter as Tokumo, see PTO-892 11/18/08).

Regarding claim 14, Pompei in view of Takahashi teaches a directional audio delivery apparatus as recited in claim 13. Although Pompei in view of Takahashi does

not explicitly teach the feature wherein the piece of information includes a noise level, Tokumo teaches adjusting the volume level of audio signals based on environmental noise levels (Tokumo, abstract) and it would have been obvious to improve the apparatus of Pompei in view of Takahashi with the same noise adjustment feature since it is well known in the art to adjust a volume based on an environmental noise level.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pompei in view of Takahashi in further view of Tanaka et al. (US Pat. No. 4,823,908, hereinafter as Tanaka, see IDS filed 1/17/08).

Regarding claim 15, Pompei in view of Takahashi teaches a directional audio delivery apparatus as recited in claim 1. Although Pompei in view of Takahashi does not explicitly teach the feature wherein the ultrasonic output from said directional speaker is reflected by at least one reflecting surface (ultrasonic wave radiator 8 which reflects of the reflective plate 19 as seen in Fig. 16 of Tanaka, col.10, lines 7-21) before propagating into the free space where a user of the apparatus is positioned, as directionally-constrained audio output, it would have been obvious for one of ordinary skill in the art to use the reflective plate of Tanaka with the directional audio delivery apparatus of Pompei in view of Takahashi with the motivation of providing a directional ultrasonic signal to a user with the some attenuation to protect the user from waves that are too powerful and potentially harmful, a concern recognized by Pompei (to reduce the possibility of exceeding an allowable ultrasound exposure, a ranging unit 540 is provided for determining the distance to the nearest listener and appropriately adjusting

the output of the adaptive parametric audio system by way of the amplifier, Pompei, [0054]).

Response to Arguments

Applicant's arguments with respect to claims 1-3, 5-16, 18-22, 24, and 25 have been considered but are moot in view of the new ground(s) of rejection.

Applicant requests that the examiner support assertions in the Office action mailed 11/18/08 about the relationship between frequency and directivity, however the assertion is withdrawn.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kile O. Blair whose telephone number is (571) 270-3544. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on (571) 272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KB

/Vivian Chin/
Supervisory Patent Examiner, Art Unit 2614